matter, and also by inaction of body, whether the result of natural indolence, or, as was originally the case in the present instance, of necessary confinement.

Various other circumstances are enumerated by the author as favouring the accumulation of fat; and various expedients pointed out for obviating this morbid tendency, founded on the principles of diminishing the supply of nutriment, of increasing the tone of the system, and stimulating it to greater activity.

The reading of a paper, entitled, "Experimental Determination of the Laws of Magneto-electric Induction in different masses of the same Metal, and of its Intensity in different Metals," by Samuel Hunter Christie, Esq. M.A. F.R.S., was commenced.

March 7, 1833.

JOHN WILLIAM LUBBOCK, Esq. M.A., V.P. and Treasurer, in the Chair.

The reading of Mr. Christie's paper was resumed and concluded.

Mr. Faraday, in his valuable papers entitled "Experimental Researches in Electricity," has advanced the proposition, that "when metals of different kinds are equally subject, in every circumstance, to magneto-electric induction, they exhibit exactly equal powers with respect to the currents which either are formed or tend to form in them;" and "that the same is probably the case in all other substances." The author not being satisfied with the conclusiveness of the experiments adduced in support of this proposition,—in order to determine its correctness, subjected different metals directly to the same degree of magneto-electric excitation, in such a manner, that the currents excited in them should be in opposite directions (as was the case in Mr. Faraday's experiment), and also that these opposing currents should have the same facility of transmission; so that the difference of their intensities, if any existed, might admit of measurement. He then minutely describes the apparatus he contrived with this view, and which consisted of helices of copper and of iron wire, covered with silk, each making sixty-five turns, but in opposite directions, and crossing each other alternately, and surrounding a cylinder of soft iron, which was rendered magnetic by the application of the large magnet belonging to the Royal Society, which the Council had placed at his disposal while engaged in these researches. The result of the experiment showed that the force of the currents from the copper helix considerably exceeded that from the iron helix, and appeared to be even more than double. By a modification of the apparatus, he found that the intensities of the currents in the two wires were very accurately proportional to their conducting powers; and hence the uniformity of the results obtained by Mr. Faraday is easily explicable.

The next object of Mr. Christie was to determine the order of the

relative intensities and conducting power of several of the metals: but previously to engaging in this inquiry, he made a series of experiments, with a view of determining the law of intensities as depending upon the length and diameter of the wire through which the current is transmitted. For this purpose it was necessary to devise means of making and breaking the contact in as invariable a manner as possible. This he accomplished by letting the same weight fall from a constant height when the contact was to be broken, and suddenly relieving the cylinder of the tension caused by the same weight when the contact was to be formed. He ascertained that portions of wire connected with the one which formed the circuit, but not included in the circuit itself, had scarcely any influence on the intensity of the current. He then enters into various theoretical investigations as to the mode of deducing the absolute intensities of the currents in this mode of experimenting.

By comparing the intensity of the electricity in wires of one metal with that in wires of each of the others, by means of the arrangement described in the beginning of the paper, and taking a mean of the results, he found the relative intensities in the following metals to be, silver 1520, gold 1106, copper 1000, zinc 522, tin 253, platinum 240, iron 223, and lead 124. The author compared these results with those obtained by Davy, Becquerel, Professor Cumming, and Mr. Harris, and states what he considers may have been the causes of the differences.

The second object of the author's inquiry relates to the law of variation of the intensity of the electricity excited in wires of different diameters: for determining which he compares the effects of three different wires of which the diameters were in the proportion of 4, 2, and 1. The results occupy several tables: and the deduction from them, with regard to the law in question, is, that the intensity varies nearly as the square of the diameter: but several causes contribute to interfere with the accuracy of this determination, and to exhibit the power as a mean of 1·844 instead of 2; the principal of which is the action of the coils upon each other.

By other methods, in which two wires of different lengths and diameters are placed so as to oppose each other in their effects, the accuracy of the conclusion that this power is the square, was satisfactorily established. Hence he arrives at the general conclusion, that the intensity or conducting power varies as the mass or weight directly, and as the square of the length inversely.

A paper was then read, entitled, "Note on the Tides." By John William Lubbock, Esq. V.P. and Treasurer of the Royal Society.

This communication contains some interesting results which Mr. Lubbock has obtained from observations made at Plymouth, Portsmouth, and Sheerness, under the superintendence of the Masters attendant at those dockyards. Mr. Dessiou has, with extraordinary perseverance, just completed the discussion of about 6000 additional observations of the tides at the London Docks, with a view to found on a more certain basis the corrections of the moon's parallax and